

**Effectiveness of using Video Modeling (VM) and
Self-modeling intervention (SM) on play skills for
Students with Autism Spectrum**

Disorder: Systematic Review

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Abstract:

Children diagnosed with autism spectrum disorder (ASD) commonly exhibit delayed play skills compared to peers without the disorder (Klintwall et al., 2015). This literature review examines the efficacy of video-modeling (VM) and self-modeling interventions in the promotion of play skills for children with ASD between 4 and 9 years of age. The literature review used three channels—electronic sources, reference lists, and journals (Cooper, 2010)—to collect data. The review encompassed a total of 10 studies ($N = 27$), all of which fulfilled the predetermined selection criteria. To determine the efficacy of VM interventions, we computed the degree to which the data did not overlap between the baseline and intervention stages as a percentage, that is, as the percentage of nonoverlapping data (PND). The findings of all 10 studies indicated that VM interventions yielded an overall improvement in play skills; the PND score of 90.8% indicated that the interventions had a high degree of efficacy. Subsequently, a number of domains have been deliberated as potential focal points for future investigations.

Keywords: Play skills, Video modeling, Autism Spectrum Disorder

المخلص:

عادةً ما يُظهر الأطفال من ذوي طيف التوحد مهارات اللعب متأخراً مقارنة بأقرانهم العاديين (كلينتوال وآخرون، ٢٠١٥). الهدف من مراجعة الأدبيات هو فحص فعالية التدخلات التي تتضمن نمذجة الفيديو والنمذجة الذاتية في تطوير مهارات اللعب للأطفال من ذوي طيف التوحد التي تتراوح أعمارهم بين الأربع إلى التسع سنوات. تم استخدام ثلاث قنوات لجمع المعلومات: المصادر الإلكترونية وقوائم المراجع ومرجعة الدوريات والمجلات المتخصصة في التربية الخاصة (Cooper، ٢٠١٠). ١٠ دراسات حققت جميع معايير الاختيار المحددة وبلغت أعداد المشاركين بتلك الدراسات ٢٧ طفلاً. من أجل تحديد فعالية التدخلات، تم حساب درجة النسبة المئوية بين خط الأساس ومراحل التدخل بواسطة النسبة المئوية للبيانات غير المتداخلة. أشارت نتائج جميع الدراسات العشر إلى أن تدخلات نمذجة الفيديو أسفرت عن تحسن شامل في مهارات اللعب، مما يجعل التدخل فعالاً للغاية مع درجة تصاميم التغذية الدقيقة بنسبة ٩٠.٨٪. بعد ذلك، تم مناقشة عدد من النقاط المحورية وتقديم توصيات للبحوث المستقبلية.

الكلمات المفتاحية: مهارات اللعب، نمذجة الفيديو، اضطراب طيف التوحد

Introduction

The subject matter of learning is critically significant and has attracted the attention of scholars from diverse academic domains. As Bandura (1977) asserted, learning is a multifaceted human phenomenon dictated by a set of inherent principles. Such principles serve as critical enablers of the manifold applications of learning in diverse contexts, particularly in those related to education and social domains. The acquisition of novel behavioral patterns and diverse cognitive and emotional abilities that facilitate adequate adaptation to both internal and external surroundings, which enables a person to effectively confront and mitigate associated challenges and risks, constitutes the process of learning.

Several theories have attempted to explain how learning occurs in education. For example, the theory of social learning (also known as “observational learning” and “modeling learning”), devised by Bandura (1977), emphasizes the importance of social interaction, social norms, and social conditions in learning. In other words, the theory posits that learning does not occur in a vacuum but rather in a social setting. Bandura’s theory views the individual as a social object who is influenced by the attitudes, feelings, and behaviors of others; consequently, the individual can learn new behaviors through observation and imitation. According to this theory, learning by observation occurs neither abruptly nor in a single step. Bandura argued that there are three types of modeling: (1) live modeling, in which the model performs the behaviors instead of the learner, (2) video modeling (also called “symbolic modeling”), in which modeling occurs through a film or a story and can take place across several counseling or therapeutic sessions, and (3) participation, in which the individual describes the desired behavior in detail and asks the participant how to engage in it. According to social learning theory, the learning process is usually marked by four major stages: attention, retention, motivation, and motor-reproduction processes. During the attention stage, the individual must be sufficiently attentive to learn from others. Retention is what a person learns regarding behavior through observation, which they can retain until needed and then perform via imitation. Motivation is the desire to perform an observed behavior that met with success; notably, it is often governed by the individual’s attitude. Finally, a motor-reproduction process is the performance of a learned task.

Although individuals typically do not initially perform such tasks well, they can perfect the tasks through repetition (1977).

Video modeling (VM) interventions are considered a form of observational learning in which a person watches a video of themselves or a model performing a target skill (Bellini & Akullian, 2007). After the video is presented one or more times, the individual has the opportunity to perform the skill. VM interventions can result in faster acquisition and generalization than other types of observational learning (Charlop-Christy et al., 2000). Children can acquire, maintain, and generalize the target skill after the intervention is over (Besler & Kurt, 2016; Kim, 2016). Technological advances have made it easy to create and apply VM interventions in an accessible and affordable manner. Moreover, thanks to VM accessibility, parents and educators can collaborate to achieve positive outcomes in children with autism spectrum disorder (ASD) (Kara et al., 2006).

Language and social interaction are essential for children's development of the ability to deal with others. Most children learn to improve their experiences and language through interaction with other children. Play skills are pivotal to a child's life (Lifter, 2000). Playing is fundamentally important in the development of children, regardless of whether they have a disability (Boutot et al., 2005). Individuals with ASD generally have difficulty with language and social communication; therefore, in early special education, improving play skills is a high priority for children with ASD (Lifter, 2000).

Children with ASD often demonstrate delayed play skills compared to typically developing children (Klintwall et al., 2015). They may have difficulty engaging in imaginative play, initiating play with others, and understanding social cues during play (Kasari et al., 2006). These difficulties can have a negative impact on their social development and quality of life. Certain interventions aimed at improving play skills in children with ASD have shown promise. For example, one study found that a play-based intervention that focused on joint attention and social communication skills resulted in significant improvements in play skills and social behaviors among children with ASD (Kasari et al., 2006). Another study found that a parent-implemented intervention that targeted play skills

and social communication led to improvements in both of these areas as well (Vismara et al., 2013).

Play is vital for both improving social interaction and promoting critical cognitive development (McConnell, 2002). Teaching play skills may help children with ASD develop cognitive strategies to deal with their environments, thereby decreasing rigid and repetitive behaviors and improving interaction system with others (Sherratt & Peter, 2002). Morrison et al. (2002) found that a VM intervention was an effective educational method for improving play skills among individuals with ASD.

The purpose of the study

This study seeks to determine the extent to which the implementation of video self-modeling interventions (VSMIs) influences the social play skills of individuals with ASD.

The study's question

To what extent do VSMIs influence the social play skills of individuals with ASD?

Method

Search Procedures

To comprehensively identify studies related to the focus of this review, three channels were used: electronic sources, reference lists, and journals (Cooper, 2010). First, electronic sources were used, including the PsycINFO, Taylor and Francis Online, and Google Scholar databases. The following key terms were applied: (video modeling AND autism OR ASD OR autism spectrum disorder) AND (video modeling AND functional play) AND (observational learning AND functional play AND autism) AND (autism AND sibling modeling) AND (self-modeling video AND (autism OR ASD OR autism spectrum disorder) AND social play skills). The search was limited to studies published in peer-reviewed journals between 2009 and 2018. A total of 61 articles were identified, and the articles' titles and abstracts were briefly reviewed. Next, 15 articles were selected for a full-text review. Eight of the 15 articles met the inclusion criteria.

For the second channel, the reference lists of the eight selected articles were reviewed, and an additional one study that met the inclusion criteria was identified. Finally, the "browse journal" channel was used as the third search method. We reviewed the following journals: *Research and Practice*

for Persons with Severe Disabilities, *Journal of Applied Behavior Analysis*, *Journal of Autism and Developmental Disorders*, and *Education and Training in Autism and Developmental Disabilities*. One study from the reviewed journals met the inclusion criteria (see Figure 1).

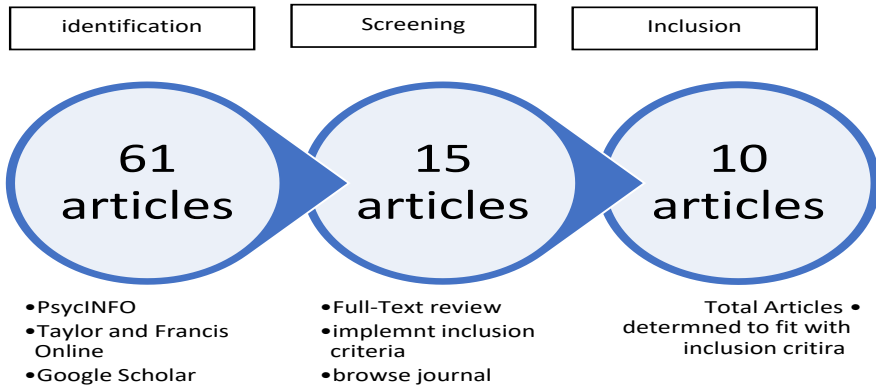


Figure 1. Results of search strategy [Liberati et al., 2009].

Inclusion and Exclusion Criteria

Studies were selected for review if they (a) included at least one participant with ASD who was four to nine years old; (b) implemented only the Video Modeling (VM) method or an Self-modeling intervention to increase play skills among children diagnosed with ASD; (c) used the VM method as videotaped by an adult model, parental model, peer model, or self-model; (d) were published in peer-reviewed research journals between 2009 and 2018 in the English language; (e) utilized a single-case design that described an experimental control, such as a multiple-baseline, reversal, or alternating treatment design; and (f) included a graphic display of child outcomes with readable values for both the X and Y axes.

Studies were excluded if they (a) included participants with ASD aged less than three years or more than 10 years; (b) implemented only the VM method or only an SM intervention to increase play skills for children who were not diagnosed with ASD; (c) used the VM method as videotaped by teacher or researcher models; (c) were published in peer-reviewed research journals either earlier than 2009 in the English language or in other

languages; (d) utilized a single-case design that did not describe an experimental control, such as a multiple-baseline, reversal, or alternating treatment design; or (f) described the results without using a graphic display of child outcomes with readable values for both the X and Y axes.

Data Processing and Analysis

All studies that fulfilled the predetermined criteria for inclusion underwent a rigorous review process wherein they were meticulously examined and subsequently categorized based on three distinct themes: peer models, adult models, and self-models. The classification was accomplished using a tailored computerized data sheet that was purposefully designed for this review. The studies under analysis were deemed to incorporate peer models if the corresponding video featured demonstrations of peers engaging in play behavior or, alternatively, if the video aimed to accentuate the promotion of play behaviors in the participants via one or more peer models. The present investigation classified the studies as exhibiting adult models in cases where the object of the video model was to enhance the play behaviors of the participant alongside one or more adults. The classification of studies as using self-models was based on the criterion that the video model included efforts toward enhancing the play behaviors of the participant vis-à-vis their own self. After classification, every examination was encapsulated by the following characteristics (refer to Table 1): (a) the delineation of participant traits (e.g., gender, diagnosis, and age range); (b) the environmental settings (e.g., domicile, therapy room, or educational environment); (c) the variant forms of models; (d) schematics of the study (e.g., AB, ABA, or ABAA); (e) the dependent attribute; and (f) the interventional percentage of nonoverlapping indices (PND). The present study employed the use of the Positive and Negative Affect Schedule (PANAS) to quantify the outcomes of the utilization of VMs and VSMs.

To obtain the PND value, the number of video modeling points exceeding the highest point in the baseline was divided by the total number of intervention points. Following the method of Scruggs and Mastropieri (1998), the total points were subsequently transformed into percentages. In their study, Scruggs and Mastropieri presented a set of criteria for assessing the merits of PND values. Specifically, they stipulated that an intervention with a value below 50% should be considered ineffective, an intervention with a value ranging between 50% and 70% should be deemed questionable,

an intervention with a value between 70% and 90% should be regarded as effective, and an intervention with a value above 90% should be seen as signifying a highly effective intervention.

Results

Video Model

Ten studies met all the selection criteria (see Table 1). Of the 10 studies reviewed, nine included parents, peers, and/or adult modeling in their samples (Boudreau & D'Entremont, 2010; Dupere et al., 2013; Gail & Rebecca, 2010; Kim, 2016; MacDonald & Sacramone, 2009; MacManus et al., 2015; Ozen et al., 2012; Sani-Bozkurt & Ozen, 2015; Scheflen et al., 2012). The subjects in all nine studies were 26 children with autism ($n = 26$). The average age of the participants was 6 years and 5 months (range 4–9 years). Only one study used home as a setting (Kim, 2016), while five studies used a therapy room (Boudreau & D'Entremont, 2010; Gail & Rebecca, 2010; Ozen et al., 2012; Sani-Bozkurt & Ozen, 2015; Scheflen et al., 2012). Three reviewed studies used a classroom (Dupere et al., 2013; MacDonald & Sacramone, 2009; MacManus et al., 2015). Six studies used adult models (Boudreau & D'Entremont, 2010; Dupere et al., 2013; Gail & Rebecca, 2010; Kim, 2016; MacDonald & Sacramone, 2009; MacManus et al., 2015), and only one study (Sani-Bozkurt & Ozen, 2015) used both adult and peer models. Two studies used peers as models (Ozen et al., 2012; Scheflen et al., 2012).

Four studies applied a multiple-probe design across subjects (Boudreau & D'Entremont, 2010; Gail & Rebecca, 2010; MacManus et al., 2015; Scheflen et al., 2012). Four experiments used a multiple-probe design across playsets (Dupere et al., 2013; Kim, 2016; MacDonald & Sacramone, 2009; Sani-Bozkurt & Ozen, 2015), while only one (Gail & Rebecca, 2010) study used both multiple-probe design across playsets and across subjects. One intervention (Ozen et al., 2012) used a multiple-probe design across behaviors (see Table 1). Kim (2016) reported that the purpose of conducting their research was three-pronged. The main goal was to examine the impact of using video model intervention (VMI) on play skills for three Korean children with autism in the United States. According to Kim (2016), the subjects in the study had different stages of interest and needs. The participants were given a few receptive and expressive vocabulary words,

interacted with others, and followed a few directions provided by a familiar person. The subjects could speak a few words in both Korean and English. In addition, the parents who participated were not trained in this study. Direct observation and interviews were used as goal-setting methods. To develop the language, the researcher used model play scripts created with the assistance of the participants' mothers. Video clips were recorded for use as zoo play sets, cooking sets, and dollhouses. The researchers recorded the videos in Korean and English. The videos were 1–2 minutes long, and every part of the video had 15–17 words and 9–10 steps for the play actions. The researcher provided videos to be viewed in the children's homes. Kim used a revised multiple-probe research design: first, pre-assessment and video recording; the researcher performed direct observations prior to the intervention to create a play session. Second, the researcher designed the baseline, which was based on providing materials for the children to use in their bedrooms and asking their mothers to be present. Each session of the baseline was conducted for 5 minutes. Third, in the intervention session, the mothers were provided with the videos of the children's rooms and were asked to play them with the children while the children's responses or other behavior were observed. There were no additional prompts after the videos. The play session was provided every 5 minutes. Then, the researcher used two types of generalizations. The researcher used a checklist after each session. The findings indicated that all participants increased scripted verbalizations and play actions after 2 weeks of the intervention. Furthermore, generalization for script players and playsets was considered low; however, it still increased levels. The findings of this study indicate that all participants increased verbalizations and playsets with VM. Moreover, social behaviors increased during the follow-up phases. The study revealed that the participants showed a low level of stimulus generalization. The results revealed that all three subjects exhibited low levels of scripted and unscripted verbalizations during the baseline stage. When the researcher used VMI, the participants obtained scripted verbalizations.

Self-modeling

Only one study that included video self-modeling in the intervention to improve play skills (Lee et al., 2017) met the inclusion criteria in this review. The participant was 5 years old. The study employed a home setting

and a self-modeling design. In addition, a multiple-probe design across three sets of toys was used. Lee et al. (2017) conducted a single-case study to measure video self-modeling on both levels of acquisition and generalization of functional play skills. The selected participant was a 5-year-old male, Asian American child with autism. The child had been diagnosed at the age of 2 years by a “licensed clinician according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR).” The researcher selected the subject based on the following criteria: (a) clinically diagnosed as being on the autism spectrum, (b) limited functional play skills, (c) an ability to imitate others, and (d) an interest in watching videos. The participant was nonverbal and communicated through pictures; the researchers communicated with the participant using an iPad program. The experiment was conducted in the living room of the participant’s home, which contained two couches, a table, two chairs, a television set, a desk, and a bookshelf. A laptop for the participant to watch videos and a video camera were set up. Researchers provided three sets of toys with which the child was to learn functional play skills: farm toys, doctors’ clinic toys, and rescue toys. The subject was not allowed to see the toys prior to commencing the experiment. The self-modeling video was developed prior to the baseline session by asking the child to perform the target behaviors while being videotaped by the trainer. Recordings were made for each of the three toy sets, each on separate days. Each video lasted approximately 2 minutes. A single-case, multi-probe experimental design across the three sets of toys was used for the case study. The researchers induced the right play actions with the intervention toys. Generalization toys were used as the dependent variables, and the baseline, intervention, and maintenance phases were used as experimental conditions. During the baseline phase, the investigators assessed the child’s performance level separately for each of the three toy sets. The researchers allowed the subject to play for 2 minutes with the toys without any visual or physical prompts from the investigators. Toys were provided at random, and no behavior reinforcement was administered when the child completed the task. The second stage of the experiment consisted of training with self-modeling videos and generalizations. First, the self-modeling video was fast-forwarded to the point where the subject could observe himself mastering the new skill. No prompts were given to the child while he was

watching the video. He was then asked to play with the toys from the video for 2 minutes immediately after watching it. After the participant capably performed the target skill, the researchers conducted a generalization measure to determine the extent to which the subject could generalize the skill to novel but similar toy sets in the absence of self-modeling videos. Only verbal prompts were used during this phase. During the third (maintenance) phase of the experiment, the researcher recorded the child's degree of mastery of the target skills. No videos were used for this session. Once the subject was able to demonstrate 80% of the targeted skills for three sequential sessions, the researchers paused and then reexamined the subject 2 weeks later (Lee et al., 2017). The results pointed to a significant relationship between exposure to self-modeling videos and increased rates of play actions with the toy sets. The video interventions improved the subjects' percentages of demonstrated, targeted, functional play skills for the intervention toys, and these percentages remained high 2 weeks after the video sessions.

Percentage of Nonoverlapping Indices

Based on PND data analysis, the study using adult modeled VM was determined to be an effective intervention for teaching play skills (PND = 89.7%). The nine studies using peer or parent models were determined to be effective interventions for teaching play skills (PND = $0.87 + 0.90 + 0.94 + 0.75 + 0.73 + 1.00 + 0.95 + 0.97 + 0.97 = 7.11/8 = 89.7\%$). The study using self-modeled VM was determined to be a highly effective intervention for teaching play skills (PND = 100%). These findings support the efficacy of VM interventions in increasing appropriate play skills among children with ASD. Across subjects, settings, and conditions, VM interventions generally improved play skills (PND = 90.8%). The results indicate that VM and SM interventions are effective strategies for targeting play skills.

Discussion

The present systematic review illuminated 10 studies that sought to assess the efficacy of video modeling (VM) and self-modeling (SM) interventions targeting play skills in individuals with autism spectrum disorder (ASD). The assessment of intervention effectiveness was primarily based on the percentage of nonoverlapping data (PND). Similar to various educational interventions employed for students with autism, VM

interventions are not universally effective and may not be suitable for all individuals diagnosed with autism. However, the outcomes of this study substantiate the contention that VM interventions present a well-suited alternative for numerous individuals diagnosed with autism.

Among the 10 studies considered, a significant proportion of nine demonstrated that the implementation of peer or adult models was effective in the interventions (PND = 89%) (Boudreau & D'Entremont, 2010; Dupere et al., 2013; Gail & Rebecca, 2010; Kim, 2016; MacDonald & Sacramone, 2009; MacManus et al., 2015; Ozen et al., 2012; Sani-Bozkurt & Ozen, 2015; Scheflen et al., 2012). The aforementioned investigations clearly demonstrate compelling evidence (PND = 89%) supporting the efficacy of using VM as an intervention strategy to enhance play-related competencies, encompassing both physical movements and verbal expressions (Dupere et al., 2013; MacDonald & Sacramone, 2009). In addition to the aim of improving play skills among children diagnosed with ASDs, various studies have sought to enhance social skills to foster cooperative and reciprocal play. Moreover, the majority of investigations pertained to sociodramatic play, characterized by children personifying characters or assuming roles and enacting actual-life occurrences, fanciful tales, and theatrical situations (Boudreau & D'Entremont, 2010; Dupere et al., 2013; MacDonald & Sacramone, 2009).

As evidenced by the previous academic literature on VM interventions, the individuals portrayed in the intervention videos were adults and not juveniles. Adults are frequently selected for research because of their convenience in terms of recruitment and direction (Boudreau & D'Entremont, 2010; Dupere et al., 2013; Gail & Rebecca, 2010; Kim, 2016; MacDonald & Sacramone, 2009; MacManus et al., 2015). Despite this, only one study (Sani-Bozkurt & Ozen, 2015) has made an attempt to customize the models in videos to match the characteristics of participants. Nonetheless, As expected, the study yielded affirmative results with respect to enhancing play skills. The findings elucidated in the reviewed studies demonstrate that VM interventions are efficacious in enhancing play abilities, irrespective of the type of model used, namely adult, peer, or SM, in the context of play skill development. However, it should be noted that there is a dearth of knowledge regarding the impact of model types (e.g., adult, peer, and sibling) on the generalizability of play skills. It is

noteworthy that using peers as exemplars is associated with more favorable outcomes (Ozen et al., 2012; Scheflen et al., 2012).

While affirmative factors are associated with the implementation of interventions within a well-organized milieu, such as a controlled classroom or therapy space, the literature reveals that inadequate attention has been devoted to classifying interventions within domestic environments (Boudreau & D'Entremont, 2010; Gail & Rebecca, 2010; Kim, 2016; Ozen et al., 2012; Sani-Bozkurt & Ozen, 2015; Scheflen et al., 2012). According to Kim's (2016) findings, although the level of generalization observed for script players and playsets was low, there was a discernible increase in this measure. The findings of the study demonstrate a tendency toward limited stimulus generalization among the participants.

According to Kim's (2016) research, incorporating the VM intervention strategy as demonstrated by parents proved to be an effective method in teaching play skills, as evidenced by a PND of 97%. The present study's findings suggest an increase in verbalizations and playset utilization among all participants when exposed to a video model. Furthermore, there was an observed escalation in social behaviors during subsequent phases of the evaluation. The findings of the study indicated that each of the three participants exhibited a relatively deficient level of scripted and unscripted verbal expressions during the baseline phase. The utilization of the visual motor integration test by the researcher resulted in the provision of predetermined verbalizations to the participating individuals.

MacManus et al. (2015) presented a comprehensive study of the subject matter. Their findings revealed a significant enhancement in the play abilities of the participants after viewing all three videos. The present study revealed that the implementation of an adult-modeled VM intervention exhibited a significantly high level of effectiveness in instructing play skills, as evidenced by a PND value of 95%. Boudreau and D'Entremont (2010) posited that the outcomes of their study indicated a significant increase in both actions and verbalizations displayed during VM sessions relative to baseline observations. Nonetheless, solely a solitary young individual derived advantages from the protracted upkeep. The second participant exhibited a pervasive escalation in his measures of proficient enactment of play-related activities. The research findings indicate that the application of modeled actions and verbalizations can be generalized to a novel

environment in young children who exhibit limited verbal capabilities. The present study demonstrated that the use of the VM technique, as modeled by adult individuals, yielded favorable results in the teaching of play skills. The PND analysis indicated that the intervention was highly effective (PND = 97%).

Sani-Bozkurt and Ozen (2015) postulated that the use of peer models vis-à-vis adult models in the delivery of instructional videos for imparting play skills to children diagnosed with ASD did not yield substantial distinctions. In contrast, Dupere et al. (2013) reported that three children exhibited scant scripted behavior and vocalizations during the baseline phase. After undergoing training, all three subjects successfully attained proficiency in the scripts not only during the training session but also in settings beyond the immediate training environment. The intervention, which involved VM facilitated by both peer and adult models, was effective in the acquisition of play skills, with a PND value of 75%.

The findings of MacDonald and Sacramone (2009) demonstrated that the two participants with autism quickly understood the scripted verbalizations and actions. The children with autism also maintained this understanding throughout the course of the investigation. The researchers recorded a clear increase in verbalizations and actions among the participants. In addition, the researchers noted that mutual verbal and collective play were consistent. The researchers reported that the participants were involved in more scripted verbalizations than actions and that they showed engagement in all types of unscripted play, whether through verbalizations or actions. They went on to discuss the potential for play skill learning to lead to more actual social interactions. This change could have a vital influence on the social interactions of children with autism. In their study, children with autism did not show collaborative play before VM interventions; however, they engaged in collaborative play through reciprocal verbal interactions afterward. The VM intervention that was modeled by adults resulted in a highly effective intervention for teaching play skills (PND = 90%).

In a study conducted by Scheflen and colleagues, it was found that the subjects successfully watched the VM to learn how to play. According to the findings of the study conducted in 2012, it was determined that the participants were able to effectively observe and comprehend the intricacies

of the virtual model to acquire the skills necessary for gameplay. Based on the results of this investigation, it became evident that the language scores of the four subjects exhibited considerable enhancement throughout the duration of the intervention. In addition, the entire cohort of four participants exhibited an aptitude for advancing through various stages of gameplay and furthermore displayed sustained retention of those improvements during the restricted maintenance phase of the study. The study revealed that a subset of the participants displayed a suboptimal rate of advancement, which was also marked by a lack of consistency. Furthermore, certain participants demonstrated an increase in their use of language during gameplay. The results of the present study reveal that the VM intervention, featuring peers and adults as models, was effective in enhancing play skills, as witnessed by a high percentage of positive nonverbal displays (PND = 87%).

According to a study conducted in 2017, the SM intervention exhibited a remarkably efficacious intervention in training individuals in the acquisition of play skills, with a 100% rate of positive noticeable difference. The work undertaken by Lee et al. (2017) indicated a substantial correlation between exposure to SM videos and a noticeable elevation in the frequency of play with the toy sets. The video-based interventions were found to enhance the participants' levels of specific, instrumental, and operational play proficiencies associated with the toys involved in the intervention. Additionally, the aforementioned proficiency levels were maintained in heightened states for a period of 2 weeks after the conclusion of the video-based intervention program.

In light of the relatively straightforward nature of VM interventions, future inquiries should investigate the potential for "expanding" the implementation of such interventions by means of administering them in small groups of children or incorporating them into the curriculum as a means of facilitating the transition from specialized educational settings to public schools. The study conducted by Ozen et al. is a valuable contribution to the existing body of literature on the topic in question. The authors' research elucidates important findings that shed light on various aspects of the subject matter. Their work adds to scholarly dialogue and further enhances our understanding of the issues at hand. In 2012, video model interventions were effectively used in a small-group setting.

However, the specifics of the groups involved, such as the quantity of children and customary levels of peer involvement, remain undisclosed. Subsequent investigations should incorporate the use of technology during both the initial baseline phase and the subsequent intervention phase. The majority of research endeavors did not incorporate media equipment during their preliminary or baseline sessions. Moreover, of the evaluated research, only a few featured a specific evaluation methodology aimed at identifying which children were most apt to achieve favorable outcomes through a VM intervention. Consequently, the specific types of assessments required for a VM intervention to be considered efficacious in enhancing play remain unclear. As such, it is suggested that future research should employ a formal technique or a more rigorous follow-up protocol to address this knowledge gap.

Tables

Table 1
Video Molding on play skills

Author(s)	Participant(s) With ASD	Age(s)	Setting	Type of Model(s)	Design	Dependent Variable	Intervention PND	Percentage of PND
Kim (2016)	N= 3 Korean American children with autism	6-9 years old	Home	Adults (parents)	A revised multiple probe research design	Scripted verbalization, unscripted verbalization, scripted play action and unscripted verbalization	.97	97%
Schefflen et al. (2012)	N= 4 children with Autism	N/A	Speech therapy room	Peers	Multiple baseline designs across the four children.	Play actions and appropriate play related utterance	.87	87%
Ozen et al. (2012)	N=3 children with autism spectrum disorder	Nine years old	Audio-visual room	Peers	A multiple probe design across behaviors.	Play actions	.94	94%
Sani-Bozkurt and Ozgen (2015)	N= 3 children with autism spectrum disorder	5-6 years old	Individual training room	Peer and adults	An adapted alternating treatments design.	The percentage of difficulties for each participant act with play	.75	75%
MacDonald and Sacramone (2009)	N= 2 children with Autism	5-7 years old	Classroom	Adults	A multiple-probe design across play sets.	Scripted verbalization, unscripted verbalization, scripted play action, unscripted verbalization, cooperative play and reciprocal verbal interaction chains.	.90	90%
Dupere et al. (2013)	N= 3 children with autism spectrum disorder	5-6 years old	Classroom	Adults	A multiple-probe design across play sets	Vocalization and actions	.73	73%
Boudreau, E. & D'Entremont, B. (2010)	N=2 children with autism spectrum disorder	Four years old	Individual training room	Adults	Multiple baselines a cross subjects	modeled actions, unmodeled actions, scripted verbalizations, and unscripted verbalizations	1.00	100%
MacMarius et al. (2015)	N=3 children with autism spectrum disorder	5-6 years old	Classroom	Adults	A multiple probe design across participants and a multiple probe design 2a cross play sets within the participant	the percentages of actions and vocalizations completed	.95	95.83%
Gail and Rebecca (2010).	N=3 children with autism spectrum disorder	5-6 years old	A therapy room	Adults	A multi-element design within the participant moreover, a cross model types and a multiple probe design	(a) scripted vocalizations, (b) scripted play actions, (c) attending to video, and (d) attending to toys during video viewing.	.97	97%
Lee et al. (2017)	N=1 child with autism spectrum disorder	Five years old	Home	Self-modeling	Multiple probe design a cross three sets of toys	The percentage of play actions performed and play	1.00	100%
	N= 27							Total=90%

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References marked with an asterisk (*) indicate studies included in this research review.

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